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Financial Development and Economic Growth: The Experiences of Selected OIC Countries

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EXTENDED ABSTRACT

The financial sector, the money and capital market, has developed so much to the extent that it's been said as being in the transition continuously and there is always a demand for it. The financial system keeps changing and within a year, various types of new financial tools being introduced in the market. Moreover, the size of transaction taking place is so large, that it could affects the economy positively. If financial development causes economic growth, this is in line with the "supply-leading" views, whereas if economic growth causes financial development, then it is suitable with the "demand-following" views. Focusing on selected OIC countries, the present study aims to investigate the impact of financial development on economic growth or vice versa, in respective countries. Data collected are ranging from 1960-2005 for each country and only countries which have sufficient data (minimum of 30 years) are selected and used in the analysis. Base on this, we select the following countries in this study: Bahrain, Egypt, Iran, Jordan, Kuwait, Libya, Malaysia, Pakistan, and Saudi Arabia. Using vector autoregressive model (VAR) and vector error correction model (VECM), the above hypotheses are re-examined concerning the relationship between financial development and economic growth. The study finds that for Malaysia and Egypt, there is bi-directional causality between financial development and economic growth. Results on Iran and Jordan indicate unidirectional causality which supports the "demand-following" views, while Bahrain, Kuwait, Libya, Pakistan and Saudi Arabia signify no exact Granger-causality relationship between the two variables. In addition, with the VECM results, the error correction terms for Jordan and Kuwait are found to be significant, implying that there is a long run relationship between variable in at least one direction for each country.

Keywords: Financial development; Economic growth; Causality tests; Vector error correction model (VECM).

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Any remaining errors or omissions rest solely with the author(s) of this paper.

INTRODUCTION

The relationship between finance and economic growth is among the subject of interest in the area of economic research and development program. Past literatures and even the existing literature have been trying to analyze the impact of finance towards economic growth from different angles (McKinnon, 1973; Shaw, 1973; Fry, 1978, 1988; World Bank, 1989; King and Levine, 1993a, b among others). This is due to the fact that financial sector, the money and capital market has developed so much to the extent that it's been said as being in the transition continuously and there is always a demand for it.

With regards to the notion of which causes which, the study by Al-Yousif (2002) mentioned that either direction of causality between financial development and economic growth could occurs. If financial development causes economic growth, this is in line with the "supply-leading" views, whereas if economic growth that causes financial development then it is suitable with the "demand-following" views. Nevertheless, there is also a third view where there exist bidirectional causality relationship between financial development and economic growth. This view is proven by studies of Demetrides & Hussein (1996) and Greenwood & Smith (1997). Apart from that, there is also a possibility that none causality relationship exists between these variables. One evidence is found in the study by Lucas (1988). Thus, economists give a special highlight and try to explain the relationship of both, financial development and economic growth, where accurate measures of the impact could lead to a better economic decision and policies of a nation. Base on analysis of the Granger causality within the vector error correction model (VECM), Choong, Yusop, Law, and Liew (2005) looked at the perspective of the stock market. They come into conclusion that the stock market development Granger causes economic growth, yet just like the precaution given by Huang (2005) and Outreville (1999), they stated that the causal relationship depends heavily on a nation's monetary policy. So the impact always depends on the size and policy of a nation. Discussing the experienced of Bangladesh, Salah-uddin (n.d.) proved that in Bangladesh, there is no such long run relationship between economic growth and financial development. Interestingly, the result is in contrast, for the short run. With regards to Lesotho, a study on this African economy by Aziakpono (n.d.) indicated that, there is a weak relationship of financial development and economic growth in Lesotho. In fact, the macroeconomic variables also could not explain the growth in per capita GDP. This is due to the size of Lesotho as a small nation, and its economic growth is much more influenced by the external dependence and moreover, the role of its institutional and structural factors. Further, Acharya, Amanulla and Joy (2009) studied the relationship between finance and growth in

India. Using a panel cointegration and Fully Modified Ordinary Least Squares (FMOLS), they concluded that in India, there is a long run relationship between financial development and economic growth.

Analyzing previous literature, the observation is that much of the work in the past concentrated on the cross sectional country data which understate or overstate the result of the causality test or the study just base on a single country. Using a time series analysis on selected OIC countries, this present study uses the vector autoregression (VAR) approach to look at relationship between financial development and economic growth using Granger causality test and Vector error correction model (VECM). The major differentiating factor of this study is to look at the issue on each selected OIC countries using a time series analysis. This study is organized as follows. Following the introduction in section 1, Section 2 reviews data and empirical methods. Section 3 presents and analyzes the empirical results and Section 4 concludes.

METHODOLOGY

Data

For the analysis, the current study adopts yearly data of OIC countries available from the IMF International Financial Statistics (IFS) database. The time series data are ranging from 1960-2005 and only countries with sufficient data availability (minimum of 30 years) are selected and used for estimation. Thus, out of 51 OIC countries available in the *IMF International Financial Statistics* (IFS) database; only nine OIC countries; namely Bahrain, Egypt, Iran, Jordan, Kuwait, Libya, Malaysia, Pakistan and Saudi are selected with sufficient number of observations to be used for the purpose of this study. For models development, the variables of interest are 1) economic growth, measured by per capita real GDP; 2) Financial development, measured by two proxies either credit to the private sector (expressed as ratio of GDP) or deposit liabilities (also expressed as ratio of GDP); 3) Investment, measured by the fixed capital formation as a ratio of GDP, and 4) inflation, measured by the consumer price index (CPI). The variables are expressed in logarithmic form denoted by 'ln' and Δ indicates the first difference operator.

Methods

In methodology, the properties of stationarity of the variables are checked first using the Augmented Dickey Fuller (ADF) and the Phillips- Perron (PP) tests. (Dickey and Fuller, 1981; Phillips and Perron, 1988). A time series is said to be integrated of order d, [I(d)] if it requires differencing d times to achieve stationarity.

Next, the test of cointegration is performed using the Vector Autoregressive models (VAR) based of Johansen (1988) and Johansen and Juselius (1990). It is termed autoregressive to indicate the appearance of lagged value of the dependent variable on the right hand side and the term vector is used to indicate that we are dealing with a vector of two or more variables (Gujarati & Porter, 2009). The form of VAR is as follows:

$$V_t = \sum A_i V_{t-i} + \varepsilon_t \tag{1}$$

where V_t = [lngdp, lncre or lndep, lninv, lncpi] ; $\varepsilon_t = [\varepsilon_{lngdp,}\ \varepsilon_{lncre\ or\ lndep,}\ \varepsilon_{lninv,}\ \varepsilon_{lncpi}]$; $A_1 - A_k$ are four matrices of coefficients and ε_t is a vector of error terms; lngdp = per capita real gdp ; lncre= credit to private sector as ratio to GDP ; lndep= deposit liabilities as ratio to GDP ; lninv= fixed capital formation as ratio to GDP ; and lncpi= consumer price index. Prior to the estimation of VAR, the respective lag length, k is chosen based on the lag length criteria. This is important as if there are too many lagged terms; it will consume the degrees of freedom while if there is too little lagged terms it will lead to model misspecification.

Next, with the suggested lag length, the cointegration test is performed on the VAR model. If there is no cointegration among variables, it implies that there is no long run effect of the variables. Then the following Granger-Causality is tested:

$$\Delta y_t = \alpha + \sum_{i=1}^{p} \beta_i \Delta y_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta x_{t-i} + \varepsilon_t \tag{2}$$

With the joint hypothesis of H_0: $\gamma_1 = \gamma_2 = \ldots = \gamma_p = 0$ against H_1: $\gamma_1 \neq \gamma_2 \neq \ldots \neq \gamma_p \neq 0$, the Wald test is conducted. The rejection of the null hypothesis indicates variable X Granger-causes variable Y. However, if the VAR model indicates the existence of cointegration between variables, the long run equation is constructed. Here, the Vector Error Correction Model (VECM) will restrict the long run behavior of the endogenous variables. If there is any deviation from the equilibrium, the coefficient of the error correction term construes the speed of adjustment to the equilibrium level. The VECM could be written as following:

$$\Delta y_t = \sum_{i}^{k-1} \Gamma_i \Delta y_{t-i} + \prod y_{t-1} + \mu + \varepsilon_t \tag{3}$$

where y_t = set of I(1) variables discussed above; $\varepsilon_t \sim$ niid$(0,\Sigma)$; μ is a drift parameter, and Π is a (p x p) matrix of the form $\Pi = \alpha\beta'$ where α and β are both (p x r) matrices of full rank, with β containing the r cointegrating vectors and α carrying the corresponding loadings in each of the r vectors. The adjustment coefficients matrix α refer to the coefficients of the Error Correction Terms (ect).

EMPIRICAL RESULTS

At first, the test of stationarity is performed using the Augmented Dickey Fuller (ADF) and Phillip- Perron (PP) tests. The results are displayed in Table 1. It is found that most of the variables (lngdp, lncre, lndep, lninv and lncpi) are insignificant at level but significant at first difference. This implies that the variables are integrated at order one, ie. I(1). The null hypothesis of there is a unit root is rejected at first difference. Thus, at first difference most of the variables are stationary. In case where the variable is non-stationary, or stationary at level, the variable will be dropped from the VAR estimation.

Table 1 Unit root tests results

Country	Variable	ADF test statistic (with trend and intercept)		PP test statistic (with trend and intercept)	
		Level	First difference	Level	First difference
Bahrain	Lngdp	-3.189	-4.981***	-3.880**	-10.316***
	Lncre	-2.232	-5.370***	-2.324	-5.370***
	Lndep	-4.212**	-4.810***	-4.354***	-14.308***
	Lninv	-2.679	-4.087**	-2.633	-4.087**
	Lncpi	-1.712	-2.456	-0.732	-2.489
Egypt	Lngdp	-2.340	-3.339*	-1.754	-5.150***
	Lncre	-2.483	-6.855***	-2.470	-6.854***
	Lndep	-3.584**	-4.984***	-1.316	-5.049***
	Lninv	-1.418	-5.776***	-1.775	-5.825***
	Lncpi	-2.398	-2.562	-2.189	-2.428
Iran	Lngdp	-4.098**	-3.658**	-1.864	-4.402***
	Lncre	-2.063	-4.281***	-1.989	-4.281***
	Lndep	-2.107	-4.191**	-2.110	-6.130***
	Lninv	-1.808	-1.547	-2.773	-5.822***
	Lncpi	-3.070	-3.482*	-3.325*	-3.257***
Jordan	Lngdp	-1.999	-4.317***	-1.539	-4.293***
	Lncre	-1.516	-6.067***	-1.516	-6.500***
	Lndep	-1.372	-4.015**	-1.558	-6.535***
	Lninv	-2.245	-6.279***	-1.855	-6.281***
	Lncpi	-1.557	-3.933**	-0.496	-2.995
Kuwait	Lngdp	-2.711	-5.147***	-2.757	-5.668***
	Lncre	-1.286	-6.252***	-1.230	-6.542***
	Lndep	-3.072	-6.508***	-3.133	-6.674***
	Lninv	-2.868	-4.668***	-2.882	-11.339***
	Lncpi	-3.508*	-4.707***	-3.322*	-7.428***

Table 1 (*Cont'd*)

Libya	Lngdp	-2.326	-0.608	-1.997	-4.982***
	Lncre	0.970	-4.020**	-0.506	-9.042***
	Lndep	-1.090	-5.260***	-1.205	-5.260***
	Lninv	-2.377	-6.044***	-2.448	-6.131***
	Lncpi	-0.327	-4.692***	-0.672	-4.880***
Malaysia	Lngdp	-3.141	-5.775***	-3.256*	-6.287***
	Lncre	-1.939	-2.848	-1.939	-8.093***
	Lndep	-1.681	-5.831***	-1.742	-7.504***
	Lninv	-1.719	-4.634***	-0.973	-4.506***
	Lncpi	-2.847	-2.467	-1.958	-3.440*
Pakistan	Lngdp	-1.171	-6.130***	-1.245	-6.131***
	Lncre	-4.354***	-3.985**	-4.364***	-4.180**
	Lndep	-3.958**	-4.954***	-2.806	-4.965***
	Lninv	-3.185	-4.889***	-2.910	-6.154***
	Lncpi	-3.663**	-2.129	-2.535	-2.609
Saudi	Lngdp	-2.473	-3.690**	-1.640	-3.401*
	Lncre	-2.393	-3.821**	-1.829	-4.239***
	Lndep	-1.793	-4.151**	-1.601	-4.151**
	Lninv	-2.228	-4.080**	-2.329	-5.949***
	Lncpi	-1.463	-3.401*	-1.063	-2.375

Note: ***, **, and * denote significance at 1%, 5% and 10% respectively.Next, the maximum lag length, k, is chosen based on the lag length criteria. Since there is maximum of 4 endogenous variables (lngdp, lndep or lncre, lninv and lncpi), most of the time the lag length chosen is 2 or 3, taking into consideration the loss in degrees of freedom.

The results of all tests performed in this study are summarized in Table 2. Basically, the table provides results of Granger-causality test (with χ^2 statistics), cointegration tests of Trace and Maximum Eigenvalue; and the coefficients of error correction terms from VECM model for each country model. From Table 2, it could be concluded from the Granger Causality test results that there exist bidirectional causality between economic growth and financial development in Egypt. Given that the relationship is bidirectional, the impact of economic growth on the financial development is larger and more significant than the impact of financial development on economic growth. This could be seen from the significant level of the χ^2 statistics. The level of significance of the test is 5% in economic growth Granger-causes financial development, while financial development significantly Granger-causes economic growth is only at 10% significance level.

A similar case is observed from the results of Malaysian Granger-causality. Malaysia seems to have bidirectional relationship between growth and financial

development using *lncre* as the proxy of financial development. It is also found that the impact of economic growth in Granger-causes financial development is greater as compared to the impact of financial development on the economic growth. This could be shown by another causality from economic growth to financial development for Malaysia using *lndep* as a proxy of financial development. Thus, in general, as for these two countries, Egypt and Malaysia, both supplying-leading and demand-following views are applicable to the relationship between financial development and economic growth. But, if one is looking at the dominant view, it could be suggested that 'demand-following' view is the most significant view on this relationship.

With regards to just unidirectional Granger-causality, Iran proved to have a 'demand-following' relationship where its economic growth is found promoting the development in financial sector. The result is only applicable when *lncre* is used as the proxy to financial development. Moreover, in the case of Iran, it is interesting to see the subsequent effect where once growth Granger-causes financial development, financial development tends to promote investment to the country. Thus, the advancement and development in Iran financial sector are crucial in promoting private investment. Nonetheless, private investment in this country is not solely determined by the financial development, but it is largely caused by the economic growth. This is evidenced from the causal movement from economic growth to investment. To what extent that investment is largely caused by growth could be observed from the causality test results on which shows that investment Granger-caused by economic growth is highly significant than investment Granger-caused by financial development.

In the case of Jordan, Granger-causality also indicates unidirectional causality where it is the growth that promotes financial development, but this time the proxy for financial development is *lndep*. Observing the 'supply leading' relationship, if using *lncre* as measures of financial development, Jordan tend to give a contradicting result as compared to using *lndep* to be the proxy of financial development. With *lncre* used as the proxy of financial development, it is the financial development that promotes growth in Jordan. Thus, there is possibility of either way causality relationship in Jordan, be it the growth granger-causes financial development or otherwise.

Further, the Granger-causality suggests that there is no direct relationship between financial development and economic growth for Bahrain, Kuwait, Libya, Pakistan and Saudi. Neither the use of *lncre* nor *lndep* gives significant result in the Granger Causality test.

Table 2 Results' summary

Country	Variables	Lag length (k)	Cointegrating vector (r)	Granger causality	χ2 statistic	Error correction term (ect)	Remarks
Libya	lngdp, lncre, lninv, lncpi.	1	0	Δlncpi à Δlncre Δlngdp à Δlncpi	3.01* 3.31*	-	-
	lngdp, lndep, lninv, lncpi.	1	0	Δlndep à Δlninv	3.19*	-	-
Malaysia	lngdp, lncre, lninv, lncpi.	2	0	Δlncre↔ Δlngdp Δlngdp à Δlncpi	8.91**, 15.58*** 16.03***	-	-
	lngdp, lndep, lninv, lncpi.	2	0	Δlngdp à Δlndep Δlninv à Δlndep Δlngdp à Δlncpi	6.56** 5.98* 5.51*	-	-
Pakistan	lngdp, lndep, lninv.	1	0	None		-	-
Saudi	lngdp, lncre, lninv, lncpi.	2	2	Δlninv à Δlncpi	4.78*	-0.012	SR: Δlninv à Δlngdp LR: (-) but not significant
	lngdp, lndep, lninv, lncpi.	2	4	Δlncpi à Δlninv	10.98***	-	-
Bahrain	lngdp, lncre, lninv.	1	0	none	–	-	-
Egypt	lngdp, lncre, lninv	2	0	Δlncre ↔ Δlngdp Δlninv → Δlngdp	4.81*,6.27** 6.01**	-	-
	lngdp, lndep, lninv.	2	0	Δlninv → Δlngdp	12.94***	-	-

Table 2 (*Cont'd*)

Iran	lngdp, lncre, lninv.	2	1	Δlngdp → Δlncre Δlngdp → Δlninv Δlncre → Δlninv	13.72*** 19.82*** 5.64*	- 0.018	SR: No SR Relationship LR: (-) but not significant
	lngdp, lndep, lninv.	2	Trace = 1 Max eigen = 0	Δlngdp → Δlninv	12.68***	+ 0.006	SR: No SR relationship LR: Diverge from equilibrium
Jordan	lngdp, lncre, lninv, lncpi.	2	Trace stat. = 4 Max eigen= 1	Δlncre → Δlngdp Δlninv → Δlngdp Δlncre → Δlncpi	7.91** 4.77* 5.37*	- 0.778***	SR: Δlncre → Δlngdp Δlninv → Δlngdp Δlncpi → Δlngdp LR: Back to equilibrium
	lngdp, lndep, lninv, lncpi.	3	Trace = 4 Max eigen= 2	Δlngdp →Δlndep Δlncpi ↔ Δlndep Δlninv → Δlncpi	37.29*** 17.42***, 10.02** 13.79***	- 0.242	SR: Δlninv → Δlngdp LR: (-) but not significant
Kuwait	lngdp, lncre, lninv.	1	1	None		-0.034	SR: No SR relationship LR: (-) but not significant
	lngdp, lndep, lninv.	1	Trace = 3 Max eigen = 0	None		-0.677***	SR: No SR relationship LR: Back to equilibrium

Notes:
1. The above table displays the chi-squared statistics of causality test which are significant at 1%, 5% and 10% levels only.
2. ↔ indicates a bidirectional causality relationship
3. →indicates a unidirectional causality relationship
4. SR= short run; LR= long run.
5. ***, **, and * denote significance at 1%, 5% and 10%, respectively.

Next, succeeding the Granger Causality Test, in case there is cointegration in the VAR cointegration test, the vector error correction model (VECM) is estimated. The results are provided only for Jordan and Kuwait since regressions of both countries show the significant lag of *ect* with a correct sign, ie. negative. Table 3 below, displays the result of VECM for Jordan, with *lncre* as the proxy of financial development. The ect or cointegration vector is given by ECT= lngdp - 1.1320*lncre – 0.1547*lninv + 0.7106*lncpi – 6.3052.

Table 3 The vector error correction model results [JORDAN]

Ind. Variable	**Dependent Variable: Δ*lngdp***
Constant	0.043
$\Delta lngdp_{t-1}$	0.190
$\Delta lngdp_{t-2}$	0.400**
$\Delta lncre_{t-1}$	-0.611**
$\Delta lncre_{t-2}$	0.074
$\Delta lninv_{t-1}$	-0.197*
$\Delta lninv_{t-2}$	0.063
$\Delta lncpi_{t-1}$	-0.911*
$\Delta lncpi_{t-2}$	0.714*
ECT_{t-1}	-0.778***
Included observation	32
Adjusted R^2	0.512
F-statistic	4.617***
Diagnostic test:	
Far	0.142
Farch	0.010
Fhet	1.100
JBnormal	7.672**

Notes:
1. *Far* is the F-statistic of Breusch-Godfrey Serial Correlation LM Test.
   Farch is the F-statistic of ARCH Test.
   Fhet is the F statistic of White Heterokedasticity Test
   JBnormal is the Jarque-Bera Statistic of Normality Test.
2. ***, ** and * denote significant at 1%, 5% and 10% levels, respectively.[coefficient]

And referring to Table 3, the coefficient for the lag *ect* is negative and significant at 1% level, indicating that in long run, there exist causality relationship in at least one direction. In addition, if there is a shock in the variation, the ect shows that the model will be able to converge back to the equilibrium level. The speed of adjustment in this case is about 78%. Besides, the short run relationship shows

some significant results, where lag two of *lngdp*, lag one of *lncre*, *lninv, lncpi*, and lag two of *lncpi* is crucial in affecting *lngdp*. Explaining the relationship, the impact of lag one *lncre, lninv* and *lncpi* on *lngdp* are negative. Convincingly, the model passes all diagnostic tests of serial correlation, ARCH effects, heteroskedasticity, except for normal distribution of residuals.

Using *lndep* as a proxy to financial development in the VECM model of Kuwait, coefficient of lag ect is significant and negative which implies a significant long run relationship among variables. The VECM model is shown in Table 4. The ect or cointegrating vector for Kuwait could be written as ECT= lngdp + 0.4922*lndep – 0.0479*lninv – 3.7488.

Given that the coefficient of lag *ect* means that the dependent variable will return to equilibrium after a deviation has occurred. The short-run equation for gdp of Kuwait suggests that when the gdp is above equilibrium, the speed of adjustment is about 68% in order to achieve the equilibrium position, vice versa. In the short run too, it is found that none of other explanatory variables are significant. The model passes all diagnostic tests of serial correlation, ARCH effects, heteroskedasticity and normality of its residuals.

Table 4 The vector error correction model results [KUWAIT]

Ind. Variable	**Dependent Variable: Δ*lngdp***
Constant	-0.017
$\Delta lngdp_{t-1}$	0.196
$\Delta lndep_{t-1}$	0.448
$\Delta lninv_{t-1}$	-0.181
ECT_{t-1}	-0.677***
Included observation	28
Adjusted R^2	0.252
F-statistic	3.279**
Diagnostic test:	
Far	0.291
Farch	0.200
JBnormal	1.131
Fhet	1.566

Notes: 1. *Far* is the F-statistic of Breusch-Godfrey Serial Correlation LM Test.
Farch is the F-statistic of ARCH Test.
Fhet is the F statistic of White Heterokedasticity Test
JBnormal is the Jarque-Bera Statistic of Normality Test.
2. ***, ** and * denote significant at 1%, 5% and 10% levels, respectively.[coefficient]

Overall, it could be concluded that, base on the selected sample countries in the study, majority of Muslim countries' financial development is attributable to their economic growth or economic performance. This is mainly support the "demand-following" views. Nonetheless, financial development could also be an important factor promoting economic growth as proven by most previous studies, in particular, for countries such as Egypt, Malaysia.

CONCLUSION AND POLICY IMPLICATION

Using the VAR model, the Granger-causality test is performed within VECM of the nine countries and results suggested that for Egypt and Malaysia, there is bi-directional relationship between the two variables if *lncre* is used as the proxy to financial development. Iran and Jordan indicate unidirectional causality, where it is the growth that promotes financial development to the countries. The remaining countries, Bahrain, Kuwait, Libya, Pakistan and Saudi do not have a direct causality relationship between financial development and economic growth. Thus, the results vary depending on the proxies used and the fact that there are differences in the nature of policies, the level of advancement in financial development and the economic stability of the countries are important in determining the nature of causality relationship between financial development and economic growth. With respect to the VECM model, in long run only Jordan and Kuwait displays a significant result and the model have a tendency to converge to equilibrium. Nevertheless, the performance of OIC countries in financial development and expansion could not be denied. Malaysia for example has been ranked within the top 20 countries in the financial development index. The performances of Bahrain and Saudi are also significant from the index. Financial stability is a major cause of financial development in these three OIC countries. A strong bi-directional correlation between financial development and economic growth in Malaysia and Egypt suggests that policies from 'supply-leading' or 'demand-following' views, both has to be taken into consideration by the authorities. For Iran and Jordan, the weight should be given more to economic growth, as it is the growth that promotes the advancement in financial development in both countries. While for Bahrain, Kuwait, Libya, Pakistan and Saudi, to be able to observe the link financial development and growth, probably there is a need of improvement of the countries' macroeconomic environments' that might become channels between financial development and economic growth.

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